

THE ASTROPHYSICAL JOURNAL
CONTENTS OF VOLUME 488, PART 1

1997 OCTOBER 10, Number 1

	Page
MICROWAVE BACKGROUND CONSTRAINTS ON COSMOLOGICAL PARAMETERS <i>Matias Zaldarriaga, David N. Spergel, & Uroš Seljak</i>	1
THE OSCILLATING G MODEL: A POSSIBLE EXPLANATION FOR THE NATURE OF COSMOLOGICAL NONBARYONIC MATTER <i>Hernando Quevedo, Marcelo Salgado, & Daniel Sudarsky</i>	14
HYDROGEN RECOMBINATION LINE MASERS AT THE EPOCHS OF RECOMBINATION AND REIONIZATION <i>Marco Spaans & Colin A. Norman</i>	27
IRON AS A TRACER IN GALAXY CLUSTERS AND GROUPS <i>Alvio Renzini</i>	35
MULTIBAND PHOTOMETRY OF RICH ABELL CLUSTERS: CONSTRAINTS ON THE DWARF STAR CONTENT OF DARK MATTER <i>Stephen P. Boughn & Juan M. Uson</i>	44
IDENTIFYING MICROLENSING BY BINARIES <i>Rosanne Di Stephano & Rosalba Perna</i>	55
A STATISTICAL INVESTIGATION OF THE CONTAMINATION OF BINARY GRAVITATIONAL LENS CANDIDATES BY CATAclysmic VARIABLES <i>Anr. B. Saust</i>	64
FORMATION, EVOLUTION, AND STRUCTURE OF FRONTS PRODUCED BY UNSTEADY INJECTION OF HIGHLY MAGNETIZED, RELATIVISTIC FLOWS <i>Amir Levinson & Maurice H. P. M. van Putten</i>	69
VERY ACCURATE DISTANCES AND RADII OF OPEN CLUSTER CEPHEIDS FROM A NEAR-INFRARED SURFACE BRIGHTNESS TECHNIQUE <i>Wolfgang P. Gieren, Pascal Fouqué, & Matías Gómez</i>	74
WHY LOW-MASS BLACK HOLE BINARIES ARE TRANSIENT <i>A. R. King, U. Kolb, & E. Szuszkiewicz</i>	89
GAMMA-RAY PRODUCTION THROUGH INVERSE COMPTON SCATTERING WITH ANISOTROPIC PHOTON FIELD FROM ACCRETION DISK IN AGNs <i>L. Zhang & K. S. Cheng</i>	94
IRON FLUORESCENCE FROM WITHIN THE INNERMOST STABLE ORBIT OF BLACK HOLE ACCRETION DISKS <i>Christopher S. Reynolds & Mitchell C. Begelman</i>	109
IMPROVED EVIDENCE FOR A BLACK HOLE IN M32 FROM HST/FOS SPECTRA. I. OBSERVATIONS <i>Roeland P. van der Marel, P. Tim de Zeeuw, & Hans-Walter Rix</i>	119
A THREE-DIMENSIONAL WAVELET ANALYSIS OF SUBSTRUCTURE IN THE COMA CLUSTER: STATISTICS AND MORPHOLOGY <i>M. Gambera, A. Pagliaro, V. Antonuccio-Delogu, & U. Becciani</i>	136
AN ANALYSIS OF THE SYNCHROTRON SPECTRUM IN THE FANAROFF-RILEY TYPE I GALAXY 3C 449 <i>D. M. Katz-Stone & L. Rudnick</i>	146
THE NATURE AND ORIGIN OF $z_a \approx z_e$ ABSORPTION LINES IN THE REDSHIFT 0.20 QUASAR PKS 2135-147 <i>Fred Hamann, E. A. Beaver, Ross D. Cohen, Vesa Junkkarinen, R. W. Lyons, & E. M. Burbidge</i>	155
ASCA OBSERVATIONS OF TYPE 2 SEYFERT GALAXIES. II. THE IMPORTANCE OF X-RAY SCATTERING AND REFLECTION <i>T. J. Turner, I. M. George, K. Nandra, & R. F. Mushotzky</i>	164
THE CIRCUMNUCLEAR STARBURST IN NGC 7552: FIRST RESULTS FROM NEAR-INFRARED SPECTRAL SYNTHESIS <i>E. Schinnerer, A. Eckart, A. Quirrenbach, T. Böker, L. E. Tacconi-Garman, A. Krabbe, & A. Sternberg</i>	174

	Page
THE LONG-TERM PERIODIC OSCILLATION OF THE NGC 4151 NUCLEUS <i>V. A. Kotov, V. M. Lyuty, V. I. Haneychuk, N. I. Merkulova, L. P. Metik, & V. G. Metlov</i>	195
HUBBLE SPACE TELESCOPE AND GROUND-BASED OBSERVATIONS OF I Zw 1 AND Mrk 486 AND THE VARIABILITY OF POLARIZATION IN RADIO-QUIET ACTIVE GALACTIC NUCLEI <i>Paul S. Smith, Gary D. Schmidt, Richard G. Allen, & Dean C. Hines</i>	202
A SENSITIVE SEARCH FOR MOLECULAR GAS IN HIGH-VELOCITY CLOUDS <i>Bart P. Wakker, Edward M. Murphy, Hugo van Woerden, & T. M. Dame</i>	216
ALL-SKY 4.85 GHz FLUX MEASUREMENTS OF H II REGIONS <i>Thomas A. Kuchar & Frank O. Clark</i>	224
ON THE IONIZATION OF WARM OPAQUE INTERSTELLAR CLOUDS AND THE INTERCLOUD MEDIUM <i>D. W. Sciama</i>	234
DYNAMICAL COLLAPSE IN W51 MASSIVE CORES: NH ₃ OBSERVATIONS <i>Qizhou Zhang & Paul T. P. Ho</i>	241
ABSORPTION OF THE LINEAR POLARIZATION OF THE GALACTIC BACKGROUND RADIATION BY THE 21 CENTIMETER LINE OF H I <i>John M. Dickey</i>	258
EXPANSION OF A PHOTOIONIZED STELLAR WIND <i>Roger A. Chevalier</i>	263
QUASI-STATIONARY STATES OF DUST FLOWS UNDER POYNTING-ROBERTSON DRAG: NEW ANALYTICAL AND NUMERICAL SOLUTIONS <i>Nikolai N. Gor'kavyi, Leonid M. Ozernoy, John C. Mather, & Tanaya Taidakova</i>	268
LOOKING FOR DISTRIBUTED STAR FORMATION IN L1630: A NEAR-INFRARED (J, H, K) SURVEY <i>Wenbin Li, Neal J. Evans II, & Elizabeth A. Lada</i>	277
PHYSICAL PROPERTIES OF MOLECULAR CLOUD CORES IN L1630 AND IMPLICATIONS FOR STAR FORMATION <i>Elizabeth A. Lada, Neal J. Evans II, & Edith Falgarone</i>	286
ROSAT OBSERVATIONS OF THE SUPERNOVA REMNANT CTB 1 <i>William W. Craig, Charles J. Hailey, & Ryszard L. Pisarski</i>	307
ROTATION IN THE PROTOSTELLAR ENVELOPES AROUND IRAS 04169+2702 AND IRAS 04365+2535: THE SIZE SCALE FOR DYNAMICAL COLLAPSE <i>Nagayoshi Ohashi, Masahiko Hayashi, Paul T. P. Ho, Munetake Momose, Motohide Tamura, Naomi Hirano, & Anneila I. Sargent</i>	317
POSSIBLE EVIDENCE FOR RELATIVISTIC SHOCKS IN GAMMA-RAY BURSTS <i>E. Cohen, J. I. Katz, T. Piran, R. Sari, R. D. Preece, & D. L. Band</i>	330
THE EVOLUTION OF GALACTIC BORON AND THE PRODUCTION SITE OF THE LIGHT ELEMENTS <i>D. K. Duncan, F. Primas, L. M. Rebull, A. M. Boesgaard, Constantine P. Deliyannis, L. M. Hobbs, J. R. King, & S. G. Ryan</i>	338
EXTREMELY METAL-POOR STARS. IV. THE CARBON-RICH OBJECTS <i>John E. Norris, Sean G. Ryan, & Timothy C. Beers</i>	350
OBSERVATIONS OF PULSARS AT 7 MILLIMETERS <i>M. Kramer, A. Jessner, O. Doroshenko, & R. Wielebinski</i>	364
ANALYSIS OF OPTICAL AND ULTRAVIOLET SPECTROSCOPY OF THE DAZ WHITE DWARF G74-7 <i>M. Billères, F. Wesemael, P. Bergeron, & A. Beauchamp</i>	368
THE TEMPERATURE SCALE AND MASS DISTRIBUTION OF HOT DA WHITE DWARFS <i>David S. Finley, Detlev Koester, & Gibor Basri</i>	375
ASCA-X-RAY SPECTROSCOPY OF THE UNUSUAL B0 V STAR τ SCORPII <i>D. H. Cohen, J. P. Cassinelli, & W. L. Waldron</i>	397
IMPLICATIONS OF A CONSTANT OBSERVED BRAKING INDEX FOR YOUNG PULSARS' SPIN-DOWN <i>M. P. Allen & J. E. Horvath</i>	409
OBSERVATION OF A LONG-TERM SPIN-UP TREND IN 4U 1538-52 <i>B. C. Rubin, M. H. Finger, D. M. Scott, & R. B. Wilson</i>	413
THE FAR-ULTRAVIOLET SPECTRUM OF THE INTERMEDIATE POLAR EX HYDRAE <i>Bradford W. Greeley, William P. Blair, Knox S. Long, & Christian Knigge</i>	419

CONTENTS

v

	Page
NON-LOCAL THERMODYNAMIC EQUILIBRIUM EFFECTS OF $Ti\ I$ IN M DWARFS AND GIANTS <i>Peter H. Hauschildt, France Allard, David R. Alexander, & E. Baron</i>	428
DYNAMICS OF A THIN TWISTED FLUX TUBE <i>D. W. Longcope & I. Klapper</i>	443
VOYAGER MEASUREMENTS OF THE MASS COMPOSITION OF COSMIC-RAY Ca THROUGH Fe NUCLEI <i>A. Lukasiak, F. B. McDonald, & W. R. Webber</i>	454
STRATIFICATION WITH OPTICAL DEPTH OF THE 5 MINUTE OSCILLATION THROUGH THE SOLAR PHOTOSPHERE <i>Basilio Ruiz Cobo, Inés Rodríguez Hidalgo, & Manuel Collados</i>	462
LARGE-AMPLITUDE MAGNETOHYDRODYNAMIC WAVES IN NONHOMOGENEOUS PLASMAS <i>Ildar K. Khabibrakhmanov & Danny Summers</i>	473
SIGN SINGULARITY OF THE MAGNETIC HELICITY FROM IN SITU SOLAR WIND OBSERVATIONS <i>Vincenzo Carbone & Roberto Bruno</i>	482
CORONAL MAGNETOGRAPHY OF A SOLAR ACTIVE REGION USING COORDINATED SERTS AND VLA OBSERVATIONS <i>Jeffrey W. Brosius, Joseph M. Davila, Roger J. Thomas, & Stephen M. White</i>	488
X-RAY NETWORK FLARES OF THE QUIET SUN <i>Sâm Krucker, Arnold O. Benz, T. S. Bastian, & Loren W. Acton</i>	499
1997 OCTOBER 20, Number 2	
CONTRIBUTIONS OF THE PLASMONS TO THE ENERGY DENSITY AND PRESSURE IN THE EARLY UNIVERSE. II. CORRELATION EFFECTS <i>Naoki Itoh, Akinori Nishikawa, Satoshi Nozawa, & Yasuharu Kohyama</i>	507
GEOMETRICAL EFFECTS OF BARYON DENSITY INHOMOGENEITIES ON PRIMORDIAL NUCLEOSYNTHESIS <i>M. Orito, T. Kajino, R. N. Boyd, & G. J. Mathews</i>	515
ON THE EFFECTIVE SPATIAL SEPARATIONS IN THE CLUSTERING OF FAINT GALAXIES <i>Boudewijn F. Roukema & David Valls-Gabaud</i>	524
INTERGALACTIC HELIUM ABSORPTION IN COLD DARK MATTER MODELS <i>Rupert A. C. Croft, David H. Weinberg, Neal Katz, & Lars Hernquist</i>	532
EFFECTS OF DUST ON GRAVITATIONAL LENSING BY SPIRAL GALAXIES <i>Rosalba Perna, Abraham Loeb, & Matthias Bartelmann</i>	550
ENVIRONMENTAL EFFECT ON THE ASSOCIATIONS OF BACKGROUND QUASARS WITH FOREGROUND OBJECTS. II. NUMERICAL SIMULATIONS <i>Xiang-Ping Wu, Xiao-Hong Zhu, Yi-Peng Jing, & Li-Zhi Fang</i>	557
REPLY TO MICHEL'S "COMMENT ON ZERO-POINT FLUCTUATIONS AND THE COSMOLOGICAL CONSTANT" <i>Bernhard Haisch & Alfonso Rueda</i>	563
IS THE CLUSTER TEMPERATURE FUNCTION A RELIABLE TEST FOR Ω_0 ? <i>Sergio Colafrancesco, Pasquale Mazzotta, & Nicola Vittorio</i>	566
INTERACTION OF RADIO JETS WITH MAGNETIC FIELDS IN CLUSTERS OF GALAXIES <i>Noam Soker</i>	572
DYNAMICS OF "SMALL GALAXIES" IN THE HUBBLE DEEP FIELD <i>Wesley N. Colley, Oleg Y. Gnedin, Jeremiah P. Ostriker, & James E. Rhoads</i>	579
EVOLUTION OF THE MULTIPHASE HOT INTERSTELLAR MEDIUM IN ELLIPTICAL GALAXIES <i>Yutaka Fujita, Junji Fukumoto, & Katsuya Okoshi</i>	585
SELF-GENERATED MAGNETIC FIELDS IN GALACTIC COOLING FLOWS <i>William G. Mathews & Fabrizio Brighenti</i>	595
DWARF GALAXIES WITH GENTLE STAR FORMATION AND THE COUNTS OF GALAXIES FROM THE HUBBLE DEEP FIELD <i>Ana Campos</i>	606
VLA OBSERVATIONS OF NGC 253: SUPERNOVA REMNANTS AND $H\ II$ REGIONS AT 1 PARSEC RESOLUTION <i>James S. Ulvestad & Robert R. J. Antonucci</i>	621

	Page
DYNAMICS OF ORBITS AND LOCAL GAS STABILITY IN A LOPSIDED GALAXY <i>Chanda J. Jog</i>	642
BROAD LOW-INTENSITY WINGS IN THE EMISSION-LINE PROFILES OF FOUR WOLF-RAYET GALAXIES <i>David I. Méndez & César Estban</i>	652
NEUTRINO FLUXES FROM ACTIVE GALAXIES: A MODEL-INDEPENDENT ESTIMATE <i>F. Halzen & E. Zas</i>	669
KILOPARSEC-SCALE MOTIONS IN 3C 120—REVISITED <i>R. C. Walker</i>	675
STELLAR AND IONIZED GAS KINEMATICS IN THE CIRCUMSTELLAR REGION OF THE GALAXY NGC 7331 <i>E. Mediavilla, S. Arribas, B. García-Lorenzo, & C. del Burgo</i>	682
SOFT X-RAY LINES AND GAS COMPOSITION IN NGC 1068 <i>Hagai Netzer & T. J. Turner</i>	694
DYNAMICAL MODELING OF VELOCITY PROFILES: THE DARK HALO AROUND THE ELLIPTICAL GALAXY NGC 2434 <i>Hans-Walter Rix, P. Tim de Zeeuw, Nicolas Cretton, Roeland P. van der Marel, & C. Marcella Carollo</i>	702
THE DEEP SILICATE ABSORPTION FEATURE IN IRAS 08572+3915 AND OTHER INFRARED GALAXIES <i>C. C. Dudley & C. G. Wynn-Williams</i>	720
LIGHT ELEMENTS AND COSMIC RAYS IN THE EARLY GALAXY <i>Reuven Ramaty, Benzion Kozlovsky, Richard E. Lingenfelter, & Hubert Reeves</i>	730
DISCOVERY OF JETS AND HH-LIKE OBJECTS NEAR THE S255 IR COMPLEX <i>Mari Paz Miralles, Luis Salas, Irene Cruz-González, & Stan Kurtz</i>	749
LYMAN-ALPHA ABSORPTION AND THE D/H RATIO IN THE LOCAL INTERSTELLAR MEDIUM <i>Andrew R. Dring, J. Linsky, Jayant Murthy, R. C. Henry, W. Moos, A. Vidal-Madjar, J. Audouze, & W. Landsman</i>	760
ASTRONOMICAL SEARCH AND LABORATORY SPECTROSCOPY OF THE FeCO RADICAL <i>Eriko Kagi, Yasuko Kasai, Hans Ungerechts, & Kentarou Kawaguchi</i>	776
INTERPRETATION OF THE CENTER-FILLED EMISSION FROM THE SUPERNOVA REMNANT W44 <i>Ilana M. Harrus, John P. Hughes, K. P. Singh, K. Koyama, & I. Asaoka</i>	781
AN H II REGION ASSOCIATED WITH SN 1978K? <i>Marcos J. Montes, Kurt W. Weiler, & Nino Panagia</i>	792
UPPER LIMITS SET BY CAUSALITY ON THE ROTATION AND MASS OF UNIFORMLY ROTATING RELATIVISTIC STARS <i>Scott Koranda, Nikolaos Stergioulas, & John L. Friedman</i>	799
NONSPHERICAL STRUCTURES AND TEMPORAL VARIATIONS IN THE DUST SHELL OF α CETI OBSERVED WITH A LONG BASELINE INTERFEROMETER AT 11 MICRONS <i>B. Lopez, W. C. Danchi, M. Bester, D. D. S. Hale, E. A. Lipman, J. D. Monnier, P. G. Tuthill, C. H. Townes, C. G. Degiacomi, T. R. Geballe, L. J. Greenhill, P. Cruzalèbes, J. Lefèvre, D. Mékarnia, J. A. Mattei, D. Nishimoto, & P. W. Kervin</i>	807
UPPER LIMITS FOR MAGNETIC FIELDS ON PULSATING WHITE DWARFS <i>Gary D. Schmidt & Albert D. Grauer</i>	827
DISCOVERY AND ORBITAL DETERMINATION OF THE TRANSIENT X-RAY PULSAR GRO J1750-27 <i>D. M. Scott, M. H. Finger, R. B. Wilson, D. T. Koh, T. A. Prince, B. A. Vaughan, & D. Chakrabarty</i>	831
110 HERCULIS: A POSSIBLE PROTOTYPE FOR SIMULTANEOUS LITHIUM AND BERYLLIUM DEPLETION, AND IMPLICATIONS FOR STELLAR INTERIORS <i>Constantine P. Deliyannis & Marc H. Pinsonneault</i>	836
A LINEAR RELATIONSHIP BETWEEN THE LATITUDE GRADIENT AND 26 DAY RECURRENT VARIATION IN THE FLUXES OF GALACTIC COSMIC RAYS AND ANOMALOUS NUCLEAR COMPONENTS. I. OBSERVATIONS <i>Ming Zhang</i>	841
MAGNETOHYDRODYNAMIC SIMULATIONS OF ALFVÉNIC PULSE PROPAGATION IN SOLAR MAGNETIC FLUX TUBES: TWO-DIMENSIONAL SLAB GEOMETRIES <i>P. J. Cargill, D. S. Spicer, & S. T. Zalesak</i>	854
ON ELECTROSTATIC SCREENING OF IONS IN ASTROPHYSICAL PLASMAS <i>M. Brüggén & D. O. Gough</i>	867

CONTENTS

vii

POINT SOURCES OF GeV GAMMA RAYS <i>R. C. Lamb & D. J. Macomb</i>	Page 872
COMPTON SCATTERING BY STATIC AND MOVING MEDIA. I. THE TRANSFER EQUATION AND ITS MOMENTS <i>Dimitrios Psaltis & Frederick K. Lamb</i>	881
COMMENT ON "GRAVITATIONAL DAMPING OF ALFVÉN WAVES IN STELLAR ATMOSPHERES AND WINDS" <i>Joseph V. Hollweg</i>	895
RESPONSE TO COMMENT BY J. V. HOLLWEG <i>I. K. Khabibrakhmanov & D. J. Mullan</i>	898
ERRATUM	
DISTANT COMPANIONS AND PLANETS AROUND MILLISECOND PULSARS <i>Kriten J. Joshi & Frederic A. Rasio</i>	901
ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1997 NOVEMBER	
THE CNOC CLUSTER REDSHIFT SURVEY CATALOGS. III. MS 1621.5+2640 AND MS 0302.7+1658 <i>E. Ellingson, H. K. C. Yee, R. G. Abraham, S. L. Morris, R. G. Carlberg, & Tammy A. Smecker-Hane</i>	902
ASCA OBSERVATIONS OF TYPE 2 SEYFERT GALAXIES. I. DATA ANALYSIS RESULTS <i>T. J. Turner, I. M. George, K. Nandra, & R. F. Mushotzky</i>	902
HIGH-ENERGY SPECTRA OF ACTIVE GALACTIC NUCLEI. II. ABSORPTION IN SEYFERT GALAXIES <i>A. Malizia, L. Bassani, J. B. Stephen, G. Malaguti, & G. G. C. Palumbo</i>	903
THREE-DIMENSIONAL PARAMETERIZATION OF THE STELLAR LOCUS WITH APPLICATION TO QSO COLOR SELECTION <i>Heidi Jo Newberg & Brian Yanny</i>	903
AN OPTICAL SEARCH FOR SUPERNOVA REMNANTS IN NGC 2403 <i>David M. Matonick, Robert A. Fesen, William P. Blair, & Knox S. Long</i>	904
EIGHT NEW CARBON CHAIN MOLECULES <i>M. C. McCarthy, M. J. Travers, A. Kovács, C. A. Gottlieb, & P. Thaddeus</i>	904
OPTICALLY THICK WINDS FROM DEGENERATE DWARFS. I. CLASSICAL NOVAE OF POPULATIONS I AND II <i>Mariko Kato</i>	904
A CORONAL SPECTRUM IN THE 500–1610 Å WAVELENGTH RANGE RECORDED AT A HEIGHT OF 21,000 KILOMETERS ABOVE THE WEST SOLAR LIMB BY THE SUMER INSTRUMENT ON <i>Solar and Heliospheric Observatory</i> <i>U. Feldman, W. E. Behring, W. Curdt, U. Schühle, K. Wilhelm, P. Lemaire, & T. M. Moran</i>	905
INDEX TO VOLUMES 486–488, PARTS 1 AND 2	i



